

## SYSTEMS THINKING FOR IMPLEMENTATION RESEARCH AND PRACTICE

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The following summary report has been developed based on the transcript of the think tank session, Systems Thinking for Implementation Research and Practice, held at the 2<sup>nd</sup> annual *NIH Conference on the Science of Dissemination and Implementation*. The report summarizes the group's discussion, highlighting key issues including; challenges, barriers, strategies, questions for future research, and recommended next steps.

### Think Tank Overview

The objective of the think tank was to explore the concept of complexity in implementation and to discuss ways to maximize the potential benefit of systems thinking for implementation efforts in research and practice. The think tank session began with an overview of systems thinking, followed by presentations of 2 case studies highlighting key systems characteristics. The discussion following the presentations began with an invitation for participants to share examples of complexity from their own experiences, which lead into a discussion on the strategies and tools that could be used to address the issue of complexity.

Several dominant themes emerged from the discussion, including; the lack of support for non-traditional approaches to research, the need for collaboration and integration of multiple perspectives, the nature of the evidence, and the issue of rigor versus relevance. These themes are described in more detail below, along with strategies suggested by the participants for dealing with issues of complexity.

### Support for Systems Research

One of the challenges highlighted in the discussion was the conflict between the traditional research paradigm and the systems thinking paradigm. Although it's clear that this alternative approach is important, there exist barriers in the current system for doing this research. For example, mentioned repeatedly by the participants was the need to collaborate with various stakeholders (researchers, health plan leaders, front-line staff, community groups, ect.) and to begin to "tear-down" the silos. The participants also suggested a need to move away from the idea that it's necessary to quantify everything and measure it specifically, further suggesting the use of qualitative research techniques instead. Both ideas, transcending silos and employing methods that are better suited to capturing process, are well aligned with systems thinking. However, as mentioned by the participants, this type of research is not well supported by the current research system, which instead favors a linear, reductionist approach.

### Rigor Versus Relevance

There are several issues with respect to how evidence is created. A fundamental principle of complex adaptive systems is that the systems are always changing. Consequently, the traditional approach to creating evidence becomes problematic because of time lag. As mentioned by one of the participants, “by the time the research has been completed, the practice and policy has already changed and the research is no longer appropriate. The research and the policy feedback is so rapid and dynamic and yet our standards for research are very high and rigorous.” This quote highlights the challenge of needing to maintain the rigor while also conducting research that aligns with real world constraints such as time. The challenge lies in finding a balance between rigor and relevance.

It was also suggested that the type of evidence and how it’s defined is important. Specifically, evidence needs to be informed by both systems and research, and then tested in ways that can be rigorous. It’s also important to have evidence trials that go past the efficacy stage in order to get the sense of what that evidence would actually look like when delivered in a contextually relevant situation.

Part of the challenge with how evidence is developed and defined is the issue of context. There was a strong awareness of the critical role that context plays in defining evidence and successful implementation of the evidence. Also suggesting that it’s necessary sometimes for researchers to change their thinking and intervention depending on the population/context.

Furthermore, due to the role of context, successful implementation requires engagement of a broad range of stakeholders in the process, and for researchers to work closely with the target community from the start. The traditional approach, which assumes a one-directional, linear process where researchers develop evidence and then transfer it to practitioners to implement, generally isn’t effective or realistic. One example provided by a participant describes a situation where a practitioner was given the evidence (eg. A report) and then didn’t know what to do with it, so he/she shelved it. In this example, the barrier to evidence-based practice was primarily the gap between the evidence producers and the evidence users.

It was also mentioned that some of the practitioners feel ambivalent about evidence-based interventions because there’s a point at which the context and systems take-over and the fidelity of the evidence falls to the wayside. There was a suggestion that evidence-based research needs to be turned around so that a deductive approach is used for developing the evidence-base. Right now the practice-based evidence gets lost in the complex system. A suggestion by one of the participants is that the evidence-based practice should “relegate evidence-based interventions to a source of ideas to cope with the generation of inductively generated demands by complex systems.” Again, there lies the challenge in finding that balance between fidelity and local adaptation, or rigor and relevance.

### Complexity of the System

Also mentioned by the participants was how the implementers are often dealing with organizations, and organizations are inherently complex. Adding to the complexity is the fact that there exist multiple interdependent systems. As one participant said, “Each time we think we’ve got it down about how to help organizations implement it, we realize there’s yet another key to the system.” There are different organizations/entities in the system that can influence policy, and it’s difficult to consider all of them. All these issues leads to a lot of uncertainty in terms of managing change in complex systems.

Uncertainty is one of the fundamental reasons why traditional management strategies are not effective in complex systems. There are different strategies and approaches to managing change in complex systems. For example, the participants suggested that it’s necessary to use existing systems, identify the leverage points, and use resources that are already in place. It’s also important to understand the overall direction of the system, because studying the dynamics underneath the system isn’t enough, and both are needed. According to one of the participants, the systems approach to implementation research leads us to think that the strategic approach is to build feedback loops. In other words implementation research is about building the feedback loops across various groups, various institutions, various systems of belief, of policy, of practice.

### Strategies/Tools

There were several strategies and tools suggested by the participants for dealing with the challenges highlighted above. For instance, the participants suggested that it’s important to consider the social networks and work in collaboration (researchers, practitioners, physicians, patients) to identify the problems and create problem-based results. By using this approach the evidence will get used because those in the practice setting are driving it. The bidirectional processes helps facilitate the effective implementation as well as sustainability. A similar approach was referred to as a “guiding principles approach” in which a person works with the organizations to identify the core components of evidence-based practices and determine how they relate to their own processes within their departments. One of the participants suggested that the Public Administration field would be a good model to learn from.

Specific tools for systems thinking suggested by participants included:

- Intervention mapping, a planning tool/methodology that systematically involves the community or targeted population.
- Participatory action research and community organization, which are both very goal oriented and address many of the issues highlighted in this discussion.

Potential tools for addressing the question of how to measure systems change includes social networking and systems dynamic modeling.

### Questions for Future Research

There were numerous questions posed either explicitly or implicitly throughout the think tank discussion. The questions were predominantly related to measurement issues. The

following is a list of the potential research questions for both measurement and non-measurement issues:

- How do you measure systems change?
- How do you capture the process in such a way that it can be shared to further the knowledge in this area?
- How do you measure system characteristics such as feedback loops?
- How do people make decisions? And what are the internal and external influences of adopters, implementers, and maintainers?
- What has and hasn't worked in the participatory research literature (Look at some case examples in this literature)
- How can technology-enabled participatory democracy be used to create change?
- How can policy be coupled with direct observation to be used as a marker for measuring successful implementation?

#### Recommended Next Steps

Overall there was strong support for systems thinking and excitement about the discussion that took place at the think tank. The participants of the think tank expressed interest in continuing this conversation and requested to be kept informed of any future work being conducted by the think tank group on this issue. Suggestions from the participants for post-think tank activities of the think tank include wiki, listserve, and a future NIH forum on systems thinking for implementation.

Based on the transcript of the think tank, some recommended next steps include:

- Further training in system methods such as social network analysis and systems dynamic modeling
- Promoting research and training in skills necessary to study process of change
- Developing a common language for understanding and reporting measurement in complex systems
- Bringing together the various stakeholders (researchers, health plan leaders or front-line staff, or community groups, ect.) to discuss this issue and work towards eliminating the silos
- Focusing on making the whole system fertile ground, instead of looking just at the individual parts